87. (New) Method of claim 67 wherein the step of providing a biologically compatible implant material further comprises the step of combining said particles with at least one bioactive substance.

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88. (New) Method of claim 87 wherein the combining step includes grafting said at least one bioactive substance to said particles.

REMARKS

This submission is in response to the Official Action dated April 24, 2001. Claims 1-49 were pending in this application and were rejected. Claims 4, 21 and 35 have been cancelled herein without prejudice. Claims 50-88 have been added. Reconsideration of the above identified application, in view of the amendments and remarks herein, is respectfully requested.

Preliminarily, Applicant wishes to thank the Examiner and her supervisor for conducting an in-person interview with Applicant and his attorney on June 25, 2001. The following constitutes Applicant's written statement in compliance with 37 C.F.R. § 1.133(b) and MPEP § 713.04. Applicants' attorney and the Examiner discussed the invention, the claims in the application, and the cited art. In particular, the parties discussed the fact that the cited patent to Bruins discloses sintered implants, but does not teach particulate or granular implants as in the present invention. The parties also discussed the fact that the

cited patent to Chesterfield et al. discloses hard tissue implants with calcium hydroxide in combination with a resorbable polymer, but does not teach soft tissue implant material with calcium hydroxide in combination with nonresorbable polymers. To this end, the parties discussed possible changes to the claim language. Applicant appreciates the Examiner's indication of further consideration in this regard.

Turning to the merits of the Office Action, claims 13-17, 20 and 36-41 are rejected under 35 U.S.C. § 112, ¶ 2, as being indefinite for failing to particularly point out and distinctly claim the subject matter that applicant regards as the invention. The Examiner states that the phrase "said outer coating" lacks antecedent basis.

Claims 13 and 36 have been amended herein to correct Applicant's typographical error so that "outer coating" is now "outer layer" consistent with the preceding use of the latter term. Applicant therefore respectfully requests that the rejection be withdrawn. Applicant notes that as the amendments merely correct typographical errors, the scope of the claims has not been narrowed. Claim 41 has also been amended to correct a typographical error.

As for the remaining rejections, which are art rejections, Applicant submits that the rejections are moot in light of the amendments herein. However, Applicant discusses the claims as amended in view of the Office Action.

A. The Invention

The present invention is directed to soft tissue implants and augmentation of soft tissue in the body. It is often desirable, for medical or cosmetic reasons, to implant a material into soft tissue in order to alter its shape, contour or consistency. Various implant materials are used for soft tissue implants, but may not be fully satisfactory. The most widely used material is collagen, but collagen is resorbable by the body and thus is not permanent. Also, collagen implants are human or animal based, posing a risk of foreign body reaction (rejection) and disease transmission. Another concern with implants is that the implanted material remains at the implantation site and does not migrate. Therefore, implant materials that are permanent, safe and do not migrate are desirable.

Suitable materials for hard tissue (bone) implants are known. One such material is described in U.S. Patent No. 4,547,327 to Bruins et al. (hereinafter "Bruins"). The present applicant, Dr. Ashman, is a co-inventor of Bruins. Bruins discloses the formation of a sintered (solid) implant to replace an extracted tooth. The implant consists of particles of polymethylmethacrylate (PMMA) coated with polymeric hydroxyethylmethacrylate (PHEMA) that are sintered into a prosthesis that is implanted into the jaw.

As the Examiner notes in the Office Action, the sintered implant may have a portion that is in contact with soft tissue, e.g., gum tissue, consisting of sintered particles that are generally smaller than those in the hard tissue region. However, as discussed in

the interview, a sintered implant for soft tissue would not be desirable in many circumstances because the implant would not have the desired consistency.

What Dr. Ashman has discovered is that a PMMA/PHEMA material may be implanted in soft tissue in a particulate or loose (unsintered) form with beneficial effect. The PMMA/PHEMA material allows for the ingrowth of soft tissue into the implant and does not migrate, which is a concern with other particulate materials. The polymeric composition of the material, and its implantation in particulate form, also provides a natural consistency to the implant, as would not be the case with a sintered (solid) implant.

What Dr. Ashman has also discovered is that if the polymeric particles are coated with calcium hydroxide, the calcium hydroxide acts as a soft tissue growth promoter that advances soft tissue integration with the implant, which is desirable. Dr. Ashman had previously discovered the beneficial effect of calcium hydroxide on hard tissue, which was patented by him in U.S. Patent No. 4,728,570 cited to the Examiner in Applicant's Information Disclosure Statement. However, its beneficial effects for soft tissue implants were previously unknown.

B. The Claims at Issue

With the above in mind, Applicant addresses the present claims.

New claim 51 merely recites the subject matter of claim 4, now cancelled, and claim 13, in independent form. Thus, there is no change in scope of the recited subject matter as compared to the originally-filed claims. In the Office Action, the Examiner

contended that Bruins anticipated claims 4 and 13 under 35 U.S.C. 102(b) (see items 6 and 7 of Office Action). However, as recognized by the Examiner during the interview, Bruins discusses only sintered implants, while the claimed invention comprises "particles" as recited. In addition, the term "particulate" is recited in the preamble of claim 51 to clarify, without a change in scope, the particulate nature of the claimed invention, as opposed to, e.g., a sintered implant. Nowhere does Bruins disclose or suggest an implant of the recited material in non-sintered form. As Bruins fails to teach an element of the claimed invention, Bruins cannot anticipate it or render it obvious, and the rejection should be withdrawn.

As claim 51 is patentable, claims 52-64, which depend therefrom, are also patentable. However, Applicant makes the following observations regarding those claims. First, claims 52-64 recite the subject matter of claims 1, 5, 6, 7, 8, 2, 3, 9, 10, 11, 12, 18 and 19 as filed, respectively. There is no difference in the scope of these claims as compared to the originally-filed claims, and Applicant maintains that the claims are independently patentable.

With respect to claims 60 and 61, Applicant notes that the Examiner rejected respective claims 10 and 11 under 35 U.S.C. § 103(a) as being unpatentable over Bruins in view of U.S. Patent 5,352,715 to Wallace et al. (see items no. 14-19). According to the Examiner, although Wallace only discloses a collagen content of 1-20%, the collagen contents claimed by Applicant of about 30-65% (claim 10) and about 50% (claim 11), was

obvious because Wallace teaches that implant persistence and texture can be controlled by the amount of collagen. It would be obvious to provide the claimed collagen content to obtain a desired consistency.

Applicant respectfully disagrees. In making the rejection, the Examiner failed to recognize the distinction between the implant material of Wallace and the present invention. The material of the present invention is polymeric and may include PHEMA, which is hydrophilic and absorbs water. When the claimed material is implanted, the PHEMA absorbs and retains water from the body, altering both the volume and consistency of the implant. The characteristics of these materials must be considered in determining the amount of collagen.

In contrast, the material in Wallace consists of ceramic particles, which *do not* absorb water. The characteristics of ceramics are different than polymers and hydrophilic materials. While Wallace may teach that altering the collagen contains changes the consistency or persistence of the implant for ceramic implants, Wallace in no manner discloses or suggests the collagen and its effects content for other materials, including for those of the present invention. One skilled in the art could not, by reading Wallace, determine the collagen content for the completely different material presently claimed, and would have no expectation of success that the claimed collagen content would be effective. *See* MPEP § 2143.02 (not obvious if no expectation of success). The Examiner's rejection amounts to an improper "obvious to try" rationale. See MPEP § 2145(X)(B). As discussed

in the MPEP, the Federal Circuit has held that an obvious rejection is erroneous when based on one skilled in the art "vary[ing] all the parameters or try[ing] each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave . . . no direction as to which of many possible choices is likely to be successful." *Id.* (quoting *In re O'Farrell*, 853 F.2d 894, 904 (Fed. Cir. 1988)). That situation applies here.

Claims 67-88, which are directed to a method of augmenting soft tissue by implanting the above-discussed PMMA/PHEMA material in particulate form, are likewise patentable.[1] Neither Bruins nor any of the cited art discloses or suggests implanting the material in soft tissue in particulate, as opposed to sintered, form.

However, dependent claims 68-88 are independently patentable. In this regard, for claims 82 and 83, the Examiner is directed to the discussion regarding claims 60 and 61 above. This holds true for claim 73, which recites injecting 2-4 cc of material into the urethra sphincter, as follows. In the Office Action, even though Wallace did not disclose the amount of material to be injected, the Examiner considered claim 27 (reciting the same subject matter as claim 73) to be obvious because the amount of material would vary with the size of the defective site to be repaired. Even if correct, one skilled in the art would have no expectation that 2-4 cc of the claimed material would be effective to

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[1]Also, like claims 51-64, these claims have identical scope to claims as filed. Claim 67 recites the subject matter of claims 21, 35 (now cancelled) and 36. Claims 68-88 recite the subject matter of originally filed claims 22-34 and 42-49, respectively.

constrict the urethra. *See* MPEP § 2143.02; § 2145(X)(B). The generalized recognition that the amount would vary depending on the implant site would not lead one of ordinary skill in the art to arrive at the claimed volume of the claimed material.

Now addressing independent claim 20, this claim has been rewritten in independent form, recites the subject matter of now-cancelled claim 4, and deletes the subject matter of claim 13. Thus, once again, there is no change in scope of the recited subject matter as compared to the originally-filed claims.

Amended claim 20 recites a soft tissue implant material comprising a non-resorbable polymeric particles having a coating of calcium hydroxide with interstices between the particles effective to permit soft tissue to grow therein. In the Office Action, the Examiner rejected claim 20 under 35 U.S.C. § 103 over Bruins in view of U.S. Patent No. 5,366,756 to Chesterfield et al. (see items 22-26). The Examiner contended that Chesterfield teaches the benefit of coating implant material with calcium hydroxide as a tissue growth promoter. Therefore, it would be obvious to include calcium hydroxide on the implant particles.

Applicant reads Chesterfield too broadly. As discussed at the interview, Chesterfield does not discuss implant materials or calcium hydroxide generally. Chesterfield discusses hard tissue implants. It does not discuss and in fact makes absolutely no mention of soft tissue implant materials. Nothing in Chesterfield or any of the cited art teaches or suggests that calcium hydroxide promotes soft, as opposed to hard,

tissue growth. *See* Col. 3, lines 11-12 ("Calcium hydroxide powder is preferred as a **bone/hard** tissue ingrowth promoter" (emphasis added)). In this regard, Chesterfield teaches nothing not already disclosed in Applicant's 4,728,570 patent discussed above, which incidently, is discussed in the background section of Chesterfield. Therefore, the present invention is not obvious.

Similarly, because Chesterfield discusses only hard implant material, it does not teach the claimed material that has interstices effective to permit soft tissue growth. Moreover, Chesterfield teaches coating *resorbable* polymeric particles, while amended claim 20 clarifies that non-resorbable particles are claimed.

As for claims 1-12, 13-19, 50 and 65 they are patentable because they are dependent on claim 20, rendering the Examiners rejection of claims 1-12 and 13-19 moot.[2] Applicant therefore requests that the rejection be withdrawn and the claims allowed.

Finally, the Examiner rejected claim 37 as being unpatentable as being obvious over Bruins in view of Wallace for the same reasons claim 20 was rejected. Claim 37 as amended has been rewritten in independent form (claim 21 upon which it was based being cancelled herein) and incorporates the subject matter of claim 35 (also cancelled herein). Regardless, claim 37 is patentable for the same reasons that claim 20 is patentable. Chesterfield simply does not teach implanting a soft tissue implant material

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[2]See discussion above regarding claims 60, 61, 82 and 83 regarding the independent patentability of claims 10 and 11.

having a coating of calcium hydroxide. Chesterfield is directed solely to implanting hard tissue implant materials, and there is no suggestion of implanting soft tissue implant material coated with calcium hydroxide. Therefore, as claim 37 is patentable, the rejection should be withdrawn, and the Examiner should also allow claims 21-34, 36, 38-49 and 66 that are dependent thereon.[3]

In view of the above amendments and remarks, Applicant respectfully submits that the application is now in condition for allowance and such action is earnestly solicited. If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

October 24, 2001

Respectfully submitted,

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[3]See discussion above regarding claims 10, 11, 60, 61, 73, 82 and 83 regarding the independent patentability of claims 27, 43 and 44.

EXPRESS MAIL CERTIFICATE

Date 10/24/01 Label No. EL563287887US

I hereby certify that, on the date indicated above, this paper or fee was deposited with the U.S. Postal Service & that it was addressed for delivery to the Assistant Commissioner for Patents, Washington, DC 20231 by "Express Mail Post Office to ~~Addressee~~" service.

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Name (Print)

Catherine Perman
Signature

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Docket No: 1527/0E847

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Dr. Arthur Ashman

Serial No.: 09/448,692 Art Unit: 3738

Filed: November 24, 1999 Examiner: C. Koh

For: SOFT TISSUE SUBSTITUTE AND METHOD OF SOFT TISSUE REFORMATION

MARKUP ACCOMPANYING RESPONSE TO OFFICIAL ACTION DATED APRIL 24, 2001

Hon. Commissioner for Patents
Washington, DC 20231

Sir:

IN THE CLAIMS:

1. (Amended) [A soft tissue implant material comprising biologically-compatible polymeric particles having] Implant material of claim 20, wherein

the particles have intraparticulate pores, said pores having dimensions effective to permit soft tissue to grow therein.

2. (Amended) Implant material of claim [1] 20 wherein said particles have a diameter of up to about 500 microns.

9. (Amended) Implant material of claim [1] 20 further comprising collagen.

13. (Amended) Implant material of claim [1] 20 wherein said particles have an inner core comprised of a first biologically-compatible polymeric material and an outer layer generally surrounding said inner core, said outer [coating] layer comprised of a second biologically-compatible polymeric material, said second polymeric material being hydrophilic and having a composition different from the composition of said first polymeric material.

18. (Amended) Implant material of claim [1] 20 further comprising at least one bioactive substance.

20. (Amended) Soft tissue implant material comprising biologically-compatible non-resorbable polymeric particles having a coating of calcium hydroxide thereon[said outer layer], wherein said particles have interstices therebetween having dimensions effective to permit soft tissue to grow therein.

22. (Amended) Method of claim [21] 37 wherein said implanting step includes the step of injecting said implant material.

28. (Amended) Method of claim [21] 37 wherein said particles have a diameter of up to about 500 microns.

30. (Amended) Method of claim [21] 37 wherein said particles have intraparticulate pores, said pores having dimensions effective to permit soft tissue to grow therein.

36. (Amended) Method of claim [21] 37 wherein said particles have an inner core comprised of a first biologically-compatible polymeric material and an outer layer generally surrounding said inner core, said outer [coating] layer comprised of a second biologically-compatible polymeric material, said second polymeric material being

hydrophilic and having a composition different from the composition of said first polymeric material.

37. (Amended) [Method of claim 36 further comprising] A method of augmenting soft tissue comprising:

a. providing a biologically compatible implant material comprised of biologically compatible non-resorbable polymeric particles having a coating of calcium hydroxide thereon [said outer layer],wherein said particles have interstices therebetween with dimensions effective to permit soft tissue to grow therein; and

b. implanting said implant material within soft tissue.

41. (Amended) [Implant material] Method of claim 40 wherein said polymeric hydroxyethylmethacrylate comprises a copolymer of monomeric hydroxyethylmethacrylate and a cross-linking agent.

42. (Amended) Method of claim [21] 37 wherein the step of providing a biologically compatible implant material further comprises combining said particles with a matrix material.

48. (Amended) Method of claim [21] 37 wherein the step of providing a biologically compatible implant material further comprises the step of combining said particles with at least one bioactive substance.

October 24, 2001

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